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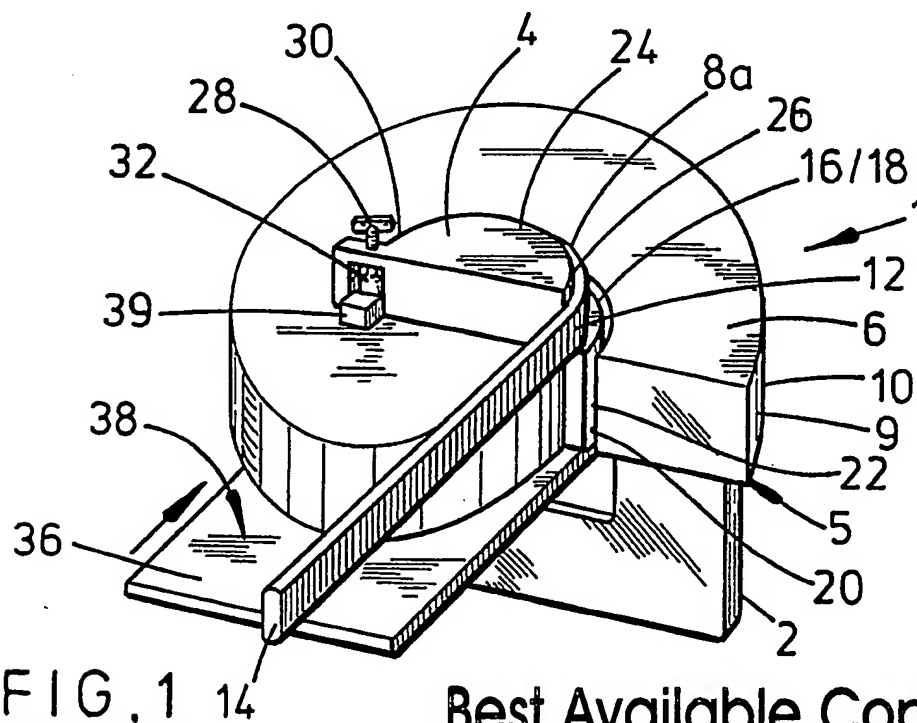
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(54) Forming metal scrollwork

(57) A first forming member 4 has an engagement means 28 to hold the end 32 of metal bar or strip 12 proximal a convex arcuate support surface 26 of the first member 4. The bar or strip 12 is then bent around the first forming member arcuate support surface 26 so as to form at least a small radius portion of a spiral 8. A second forming member 6 has a convex arcuate support surface 10 comprising a successively larger radius portion of the spiral 8 and surrounds the first member 4 but is below it. The first member 4 is then brought into co-planar interengagement so that the spiral portion arcuate support surfaces 10, 26 serially interconnect. The bar or strip 12 is then bent around the second forming member arcuate support surface 10 so as to form a radially increasing spiral 8. Further, outer former portions can be added to form a larger spiral.



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FORMING DEVICE

The present invention relates to a forming device for use in shaping strip metal into scrolls and other decorative shapes as found in gates, railings and the like.

In order to produce a spiral shaped scroll it has previously been necessary to bend a strip of metal around a helical shaped former or helically around the round beak of an anvil and then flatten the resultant conically shaped helix into a planar spiral. Flattening of the helix usually involves a considerable amount of hammering which is time consuming. Furthermore as the conically shaped helix is flattened it tends to twist the metal thereby producing an irregularly shaped spiral. Another method of forming scrolls is to bend a strip of metal around pins mounted on a base plate. The pins may be inserted or removed from the base plate to form a variety of shapes. Bending metal strips in this manner does not produce accurately shaped spirals though due to the limited support provided to the strip.

It is an object of the present invention to avoid or minimise one or more of the above disadvantages.

The present invention provides a method suitable for forming a substantially planar spiral in a metal bar or strip which method comprises the steps of:

providing a first forming member having an engagement means and a substantial support means, engaging a first end portion of a said bar to be formed in said engagement means proximal a convex arcuate support surface of the first forming member for supporting a said strip to be formed, bending said strip around the first forming member arcuate support surface so as to form at least a small radius portion of a said spiral, providing a second forming member having a convex arcuate support surface comprising a successively larger radius portion of said spiral, bringing said second forming member and said first forming member into substantially coplanar inter-relation with said spiral portion arcuate support surfaces substantially serially interconnected, and bending the bar around the second forming member arcuate support so as to form a radially increasing spiral in the said bar.

In another respect the present invention provides a forming device suitable for use in forming a substantially planar spiral in a metal bar or strip which forming device comprises a first forming member provided with an engagement means and a substantial

support means, said engagement means being formed and arranged for laterally supporting a first end portion of a said bar to be formed proximal a first end of a convex arcuate support surface of the first forming member comprising a small radius portion of a said spiral, in use of the device, so as to hold said first end portion as the bar is bent around said first forming member arcuate support surface, and a second forming member provided with a convex arcuate support surface comprising a successively larger radius portion of said spiral, said second forming member being connected to said first forming member so that at least one of said first and second members is displaceable relative to the other between a first position in which the principal planes of said small and larger radius spiral portion arcuate support surfaces are generally coplanar, and said spiral portion arcuate support surfaces substantially serially connected, and a second position in which said principal planes are offset so that a said bar extending in the principal plane of and around said first support member arcuate surface can extend substantially clear of said second member.

The present invention also provides a forming system suitable for use in forming a substantially planar spiral in a metal bar or strip which system comprises a first forming member provided with an engagement means

and a substantial support means, said engagement means being formed and arranged for laterally supporting a first end portion of a bar to be formed proximal a first end of a convex arcuate support surface of the first forming member comprising a small radius portion of a spiral in use of the system so as to hold said first end portion as the bar is bent around said first forming member arcuate support surface, and a second forming member provided with a convex arcuate support surface comprising a successively larger radius portion of said spiral, said second forming member being provided with an engagement means and a substantial support means, said second forming member engagement means being formed and arranged for laterally supporting a portion of the bar at least proximal the end of a spiral portion formed in the said bar on the first forming member, so as to hold said bar as the bar is bent around said second forming member arcuate support surface, said second forming member being independent of said first forming member, the first and second arcuate support surfaces thereof being formed and arranged to define sequential portions of a said spiral.

Thus with the present invention it is possible to produce accurately shaped planar spirals from bar or strip metal for use in gates, railings and other

ornamental metal work in an efficient and economic manner.

A spiral is a plane curve traced by a point which winds about a fixed point from which it continually recedes. Spirals of this type include Archimedes spiral, Cornus spiral, logarithmic, hyperbolic and parabolic spirals all of which may be defined by a suitable mathematical equation. There are also other spirals which are generally similar in appearance to mathematical spirals but are not mathematically true spirals. One example is the sinusoidal spiral where the tracing point does not recede continually. As used herein the term "spiral" is intended to include all such spirals i.e. any spiral shape unless the contrary is specifically indicated.

It will be understood that the present invention is not restricted to the use of two forming members and at least one further forming member having a convex arcuate support surface formed and arranged to form a further sequential portion of a radially increasing spiral, may be used in conjunction with the first and second forming members.

The substantial support means may be in the form of a base member which may be self-supporting or be formed and arranged to be connectable to a work bench, for

instance, but preferably said substantial support means is in the form of a bracket formed and arranged to be mounted in the jaws of a bench vice. Alternatively said bracket may be formed and arranged to fit into the hardie hole in an anvil.

The support means may support either the first and/or the second forming member but preferably the second forming member is rigidly attached to and thereby supported by said support means, the second forming member acting as a support means for the first forming member. Furthermore any further forming member used in conjunction with the first and second forming members may be readily supported by one of said first and second forming members or could if desired be used to support the other forming members.

Preferably the engagement means is formed integrally with the first forming member so as to support laterally the first end portion of the bar to be formed at the first end of the first forming member support surface. Said engagement means may conveniently be in the form of a screw clamp arrangement. Engagement means may also and/or alternatively be provided at any portion of the first and second forming members and may be in any suitable form for engaging the bar.

It will be appreciated that the present invention is not restricted to just radial spirals but includes any generally spiral shape including for instance rectilinear and/or angular portions.

Further preferred features and advantages of the present invention will become apparent from the following detailed description given by way of example of some preferred embodiments illustrated with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of a forming device of the invention in a first arrangement;

Fig. 2 is a perspective view of the forming device in Fig. 1 in a second arrangement; and

Fig. 3 is a plan view of a second embodiment of the invention.

The forming device, generally indicated by reference number 1, comprises a vertical support member 2 for supporting a first forming member 4 and a second forming member 6 around both of which a spirally shaped scroll 8 may be formed.

The underside 5 of the second forming member 6 is rigidly attached to the vertical support member 2. The support member 2 is a flat plate formed and arranged to be gripped in the jaws of a bench vice (not shown)

thereby firmly supporting the device 1 when in use.

The second forming member 6 has a spiral-portion shaped periphery 9 forming a convex arcuate support surface 10 around which a strip 12 of metal bar 14 may be shaped. The support surface 10 allows one complete revolution of the spirally shaped scroll 8 to be formed therearound. The centre 16 of the second forming member 6 has a semi-circular aperture 18 into which slidably fits the first forming member 4. The first forming member 4 has a semi-circular base 20 which slidably engages opposed walls 22 of the second forming member aperture 18. An upper portion 24 of the first forming member 4 has a semi-circular convex arcuate support surface 26, radially inward of the semi-circular base 20 for supporting said scroll. The first forming member 4 has an engagement clamp 28 at a first end 30 of the support surface 26 for clamping a first end 32 of a strip 12 of the metal bar 14 to be formed therearound.

The underside 5 of the device 1 has a plate 36 slidable between a first position and a second position. In the first position, as shown in Fig 1, the plate 36 is under the semi-circular aperture 18 in the second forming member 6, with the first forming member 4 sitting on top 38 thereof, so that the support surface 26 of the upper portion 24 of the first forming member 4 is in a plane

above the second forming member support surface 10. In the second position of the plate 36, as shown in Fig. 2, the plate 36 is retracted so as to allow the first forming member 4 to drop down into the same plan as the second forming member 6. The first forming member 4 is supported on a member (not shown) extending upwardly from the centre of the support member 2.

In use of the device 1 and with reference to Figs. 1 and 2, the first forming member 4 sits on top 38 of the sliding plate 36. A first end 32 of the strip 12 of metal bar 14 which to be formed is clamped in the engagement clamp 28 at the first end 30 of the first member support surface 26. The bar 14 is bent around the semi-circular support surface 26 of the first forming member 4. The plate 36 is then retracted so that the first forming member 4 and a small radius spiral portion 8a formed in the bar 14 around said first forming member 4, are brought into the same plane as the second forming member support surface 10. The bar 14 is then bent around the second forming member support surface 10 so as to form a larger radius spiral portion 8b therearound. The now completed scroll 8 may be readily removed by raising the first forming member 4 and the scroll 8 attached thereto clear of the second forming member 6 sliding the plate 36 into the first position, undoing the clamp 28 to release the first end

32 of the now formed scroll 8 and rotating the scroll 8 in a clockwise direction so as to remove the scroll 8 from the first forming member 4.

In order to prevent the first end 32 of the bar 14 from projecting beyond the first end 30 of the support surface 26 of the first forming member 4 so that it would foul the second member 6 when the first member 4 is dropped down into its second position, an end stop 39 is provided on the second member 6 directly opposite the first end 30 of the first member support surface 26 and the bar engagement clamp 28.

Fig. 3 shows an embodiment generally similar to that in Figs. 1 and 2 with the addition of third 40 and fourth 42 forming members to the first 4 and second 6 forming members around which a further larger radius spiral portions 8c may be formed in the bar 14. The third 40 and fourth 42 and any subsequent forming members may be added upon completion of the previous portion of the scroll 8. The third 40 and fourth 42 forming members are attached to and laterally supported by the second forming member 6 by a series of pins 44 connected to said third 40 and fourth 42 members which interengage with apertures 46 on said second member 6.

CLAIMS

1. A method suitable for forming a substantially planar spiral in a metal bar or strip which method comprises the steps of:

providing a first forming member having an engagement means and a substantial support means, engaging a first end portion of a said bar to be formed in said engagement means proximal a convex arcuate support surface of the first forming member for supporting a said strip to be formed, bending said strip around the first forming member arcuate support surface so as to form at least a small radius portion of a said spiral, providing a second forming member having a convex arcuate support surface comprising a successively larger radius portion of said spiral, bringing said second forming member and said first forming member into substantially coplanar inter-relation with said spiral portion arcuate support surfaces substantially serially interconnected, and bending the bar around the second forming member arcuate support so as to form a radially increasing spiral in the said bar.

2. A method as claimed in claim 1 wherein said first forming member convex arcuate support means and at least a small radius portion of a said spiral are brought into substantially co-planar inter-relation with said second forming member convex arcuate support means from a first

plane above the plane of said second forming member convex arcuate support means.

3. A method as claimed in claim 2 wherein said first forming member convex arcuate support means is brought into substantially co-planar inter-relation with said second forming member convex arcuate support means by moving a first forming member support provided for supporting said first forming member with its convex support surface in said first plane above the plane of said second forming member convex support surface, to a non-supporting position, thereby to allow said first forming member to drop into a position providing said substantially co-planar inter-relation.

4. A forming device suitable for use in forming a substantially planar spiral in a metal bar or strip which forming device comprises a first forming member provided with an engagement means and a substantial support means, said engagement means being formed and arranged for laterally supporting a first end portion of a said bar to be formed proximal a first end of a convex arcuate support surface of the first forming member comprising a small radius portion of a said spiral, in use of the device, so as to hold said first end portion as the bar is bent around said first forming member arcuate support surface, and a second forming member

provided with a convex arcuate support surface comprising a successively larger radius portion of said spiral, said second forming member being connected to said first forming member so that at least one of said first and second members is displaceable relative to the other between a first position in which the principal planes of said small and larger radius spiral portion arcuate support surfaces are generally coplanar, and said spiral portion arcuate support surfaces substantially serially connected, and a second position in which said principal planes are offset so that a said bar extending in the principal plane of and around said first support member arcuate surface can extend substantially clear of said second member.

5. A forming device as claimed in claim 4 wherein said first forming member convex arcuate support surface is stepped radially inwardly from a bar base support surface portion of said first forming member.

6. A forming device as claimed in either claim 4 or claim 5 wherein said engagement means is formed integrally with the first forming member.

7. A forming device as claimed in any one of claims 4 to 6 wherein said engagement means is in the form of a screw clamp arrangement.

8. A forming device as claimed in any one of claims 4 to 7 wherein said device is provided with at least one further forming member having a convex arcuate support surface formed and arranged to form a further sequential portion of a radially increasing spiral.

9. A forming device as claimed in any one of claims 4 to 8 wherein said device is provided with a retractable first forming member support formed and arranged for supporting, in its deployed position, said first forming member in said first position, and allowing, in its retracted position, the first forming member to be displaced to its second position.

10. A forming system suitable for use in forming a substantially planar spiral in a metal bar or strip which system comprises a first forming member provided with an engagement means and a substantial support means, said engagement means being formed and arranged for laterally supporting a first end portion of a bar to be formed proximal a first end of a convex arcuate support surface of the first forming member comprising a small radius portion of a spiral in use of the system so as to hold said first end portion as the bar is bent around said first forming member arcuate support surface, and a second forming member provided with a

convex arcuate support surface comprising a successively larger radius portion of said spiral, said second forming member being provided with an engagement means and a substantial support means, said second forming member engagement means being formed and arranged for laterally supporting a portion of the bar at least proximal the end of a spiral portion formed in the said bar on the first forming member, so as to hold said bar as the bar is bent around said second forming member arcuate support surface, said second forming member being independent of said first forming member, the first and second arcuate support surfaces thereof being formed and arranged to define sequential portions of a said spiral.

11. A method for forming a substantially planar spiral substantially as described hereinbefore with particular reference to Figs. 1 to 3.

12. A device for use in forming a substantially planar spiral substantially as described hereinbefore with particular reference to Figs. 1 to 3.

13. A system for use in forming a substantially planar spiral substantially as described hereinbefore with particular reference to Figs. 1 to 3.

Patents Act 1977
xaminer's report to the Comptroller under
Section 17 (The Search Report)

Application number 9112235.8

Relevant Technical fields

(i) UK CI (Edition K) B3E (EAE, ECX, ED, ENB, ENC, END)

(ii) Int.CI (Edition 5) B21D

Databases (see over)

(i) UK Patent Office

(ii)

Search Examiner

R Binding

Date of Search

8 July 1991

Documents considered relevant following a search in respect of claims

1 to 13

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 0954650 A (ROTHWELL)	1 and common matter of 4 and 10

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

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